

Re: ES2001-015478

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OCT - 9 2001

551335

**Subject:** In Response to Your Inquiries: Nuclear Waste, Energy, & Fusion

Mr. Presco,

Thank you for your views on the storage and disposal of nuclear waste, electricity generation from nuclear waste, and fusion energy. I have forwarded your e-mail message and attached file to the Office of the Executive Secretariat for a response by the office(s) responsible for these areas. Someone will contact you separately to follow-up on your questions and concerns.

Sincerely,

Richard Burrow  
Deputy Director  
Secretary of Energy Advisory Board

cc: Executive Secretariat

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**From:** Mark Presco  
**Sent:** Friday, June 1, 2001 3:23 PM  
**To:** Burrow, Richard  
**Subject:** Nuclear Waste Disposal

Attached is an MS Word 2000 document that proposes a low tech solution for:

1. The permanent disposal of high-level nuclear waste.
2. Generating electricity from high-level nuclear waste.
3. Generating electricity from nuclear **fusion**.
4. The permanent disposal of low-level nuclear waste.

It is a brief but serious effort to solve this problem.

Mark B. Presco  
5004 Viewridge Way  
Oceanside, CA 92056-5404  
760.630.5972  
<http://members.home.net/mpresco>

# The Permanent Disposal Of High Level Nuclear Waste

Mark B. Presco  
mpresco@home.com

## Abstract

This document outlines a technology that is intended to provide a permanent solution to the disposal of high-level nuclear waste. It has as a second objective a method to create revenues by generating electricity from this waste. The following topics are presented:

- The permanent disposal of high-level nuclear waste.
- Generating electricity from high-level nuclear waste.
- Generating electricity from nuclear **fusion**.
- The permanent disposal of low-level nuclear waste.

## History

Several years ago Scientific America reported that Lawrence Livermore Laboratories proposed to develop a device that could be used to more accurately measure the yield of a thermal nuclear warhead. This device is a vessel that can contain the detonation of an H-bomb. The detonation would heat the box and thus, the energy released could be measured. It is basically a giant calorimeter. If such a device could be built, then the objectives delineated above are feasible.

This document will propose how this devise, hereafter called the "Box", can be used to economically solve the nuclear waste problem.

## **The Permanent disposal of High Level Nuclear Waste**

The reason for proposing such a strong and massive device as the Box is, of course, for safety reasons. The Box must permanently and safely contain high-level nuclear waste for thousands of years. It must be able to withstand all possible scenarios for such high concentrations of waste, such as small explosions or meltdowns. Although it may be possible to engineer a smaller and weaker version of the Box to achieve these goals, a Box that can safely contain the detonation of a full-scale thermal nuclear warhead can expand the scope of the project. This will be discussed later.

The primary objectives for this approach are:

- Permanent disposal of high-level nuclear waste.
- Safety: No possible way for this waste to find it's way into the environment. Whatever goes into the Box, stays in the Box.
- Cost: Although this Box is expensive, billions of dollars have already been spent with no permanent solution in sight.

## **Generating electricity from high level nuclear waste**

The problem (and advantage) with concentrating high-level nuclear waste is the heat that can build up in the Box. If enough heat is produced, then electricity can be generated from the Box. Coolant pipes can be placed in the walls of the Box to extract the heat. See figure 1. It may be possible to find the right ratio (mass of the Box) to (mass of the waste) to generate electricity for thousands of years. If this is true then the Box will pay for itself well before it's lifetime.

For safety reasons it would be wise to design the Box to withstand this heat build up with no active cooling.

If enough heat cannot be produced from concentrated high-level nuclear waste to generate electricity, at least the disposal problem is solved. However, there is a solution for this situation.

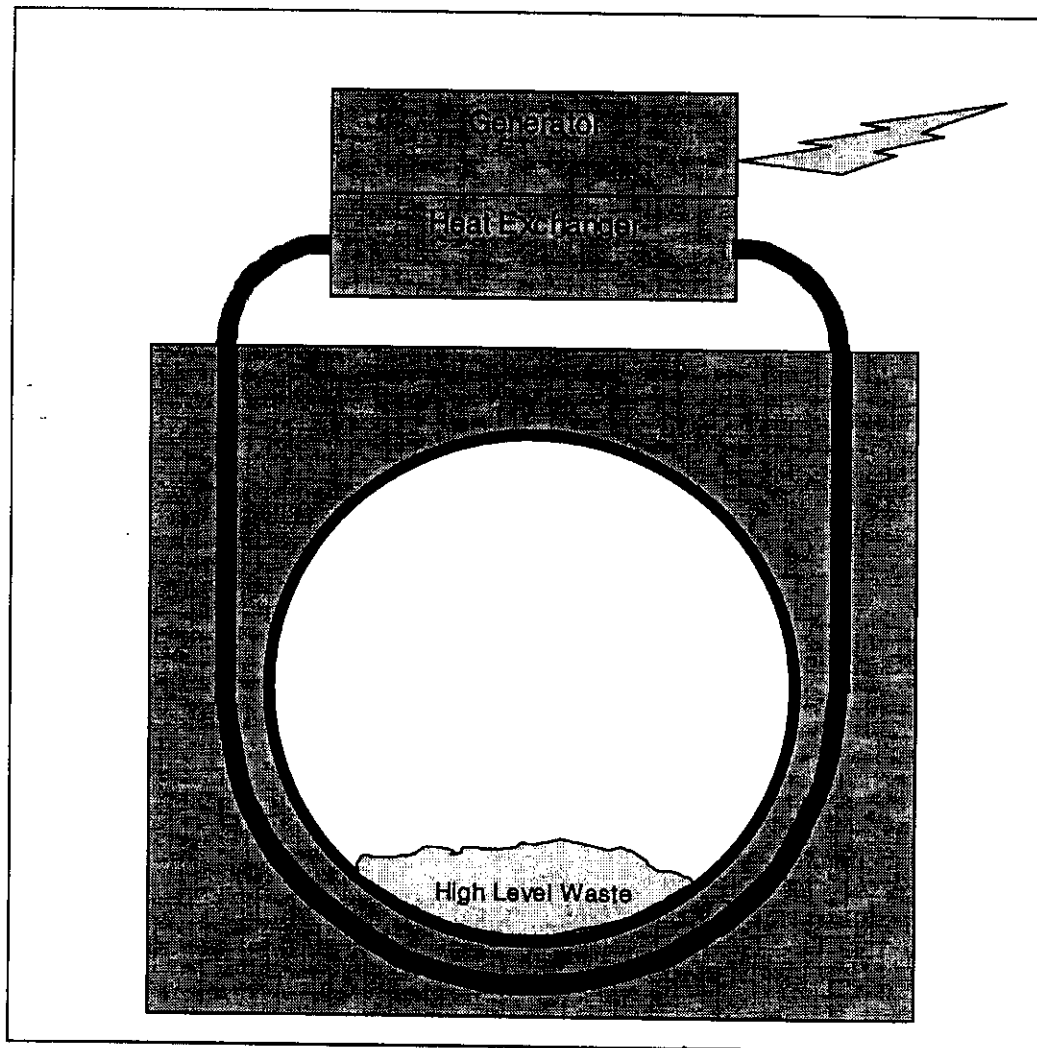


Figure 1  
Electricity generated from concentrated high-level nuclear waste

### **Generating Electricity from nuclear fusion**

The Box can be the first practical online fusion reactor if it is strong enough to safely contain a thermal nuclear detonation. There is a large stockpile of warheads to be disposed of. Since tritium and deuterium have a limited shelf life, it may be more economical to extract the energy with the Box than any other method.

This can be used in conjunction with nuclear waste to periodically add energy to the Box if the waste does not produce enough energy of it's own. The radioactive byproducts will remain in the Box and add to residual energy production.

### **Disposing of low-level nuclear waste.**

The Box can be used for the disposal of low-level nuclear waste if a filter can be designed to extract the radioactive elements from the gases that must be vented from the Box. The radioactive material will be thrown back into the Box. This is high risk and requires advanced technology.

### **Summary**

This document outlines a low-tech solution to many of the nuclear waste problems our country faces. The technical problems and considerations that arise to implement this technology are not discussed. It is the goal of this document to foment such a discussion.